AMENDMENTS TO THE CLAIMS

Claim 1 (Currently Amended): A method for manipulating a moiety in a microfluidic application, which method comprises:

a) coupling a moiety to be manipulated onto surface of a binding partner of said moiety to form a moiety-binding partner complex; and

b) manipulating said moiety-binding partner complex with a physical force in a chip format, wherein said manipulation is effected through a combination of a ~~structure~~ signal source that is external to said chip and a structure that is built-in in said chip, thereby said moiety is manipulated, and wherein

i) said moiety is a protein and said protein non-specifically binds to the surface of said binding partner that is modified with a detergent; or

ii) ~~a plurality of said moieties is manipulated~~ said moiety is a DNA, said binding partner is a porous bead and said DNA is reversibly absorbed onto the surface of said porous bead in a buffer containing high salt concentration; or

iii) said moiety is a mRNA and said mRNA specifically binds to the surface of a binding partner that is modified to contain oligo-dT polynucleotide; or

iv) said moiety is not directly manipulatable by a dielectrophoresis force and said moiety-binding partner complex is manipulated by a dielectrophoresis force; or

v) said moiety is not directly manipulatable by a traveling-wave dielectrophoresis force and said moiety-binding partner complex is manipulated by a traveling-wave dielectrophoresis force; or

vi) said moiety is not directly manipulatable by an acoustic force and said moiety-binding partner complex is manipulated by an acoustic force; or

vii) said moiety is not directly manipulatable by an electrostatic force and said moiety-binding partner complex is manipulated by an electrostatic force; or

viii) said moiety is not directly manipulatable by an optical radiation force and said moiety-binding partner complex is manipulated by an optical radiation force effected via a laser tweezers.

Claim 2 (Original): The method of claim 1, wherein the moiety to be manipulated is selected from the group consisting of a cell, a cellular organelle, a virus, a molecule and an aggregate or complex thereof.

Claim 3 (Original): The method of claim 2, wherein the cell is selected from the group consisting of an animal cell, a plant cell, a fungus cell, a bacterium cell and a recombinant cell.

Claim 4 (Original): The method of claim 2, wherein the cellular organelle is selected from the group consisting of a nuclei, a mitochondrion, a chloroplast, a ribosome, an ER, a Golgi apparatus, a lysosome, a proteasome, a secretory vesicle, a vacuole and a microsome.

Claim 5 (Original): The method of claim 2, wherein the molecule is selected from the group consisting of an inorganic molecule, an organic molecule and a complex thereof.

Claim 6 (Original): The method of claim 5, wherein the inorganic molecule is an ion selected from the group consisting of a sodium, a potassium, a magnesium, a calcium, a chlorine, an iron, a copper, a zinc, a manganese, a cobalt, an iodine, a molybdenum, a vanadium, a nickel, a chromium, a fluorine, a silicon, a tin, a boron and an arsenic ion.

Claim 7 (Original): The method of claim 5, wherein the organic molecule is selected from the group consisting of an amino acid, a peptide, a protein, a nucleoside, a nucleotide, an oligonucleotide, a nucleic acid, a vitamin, a monosaccharide, an oligosaccharide, a carbohydrate, a lipid and a complex thereof.

Claim 8 (Currently Amended): The method of claim 1, wherein the binding partner is ~~selected from the group consisting of a cell, a cellular organelle, a virus,~~ a microparticle~~, an aggregate or complex of molecules and an aggregate or complex thereof~~.

Claim 9 (Canceled).

Claim 10 (Canceled).

Claim 11 (Original): The method of claim 8, wherein the dimension of the microparticle is from about 0.01 micron to about several thousand microns.

Claim 12 (Original): The method of claim 8, wherein the microparticle is selected from the group consisting of a plastic particle, a polystyrene microbead, a glass bead, a magnetic bead, a hollow glass sphere, a metal particle, a particle of complex composition, and a microfabricated free-standing microstructure.

Claim 13 (Original): The method of claim 1, wherein the moiety is coupled to the surface of the binding partner directly or via a linker.

Claim 14. (Previously presented): The method of claim 13, wherein the linker is a cleavable linker, and upon cleavage, the moiety is cleaved from the binding partner.

Claim 15 (Original): The method of claim 1, wherein the moiety is coupled to the surface of the binding partner via a covalent or a non-covalent linkage.

Claim 16 (Original): The method of claim 15, wherein the linkage between the moiety and the surface of the binding partner is effected via a specific or a non-specific binding.

Claim 17 (Original): The method of claim 15, wherein the linkage between the moiety and the surface of the binding partner is a cleavable linkage.

Claim 18 (Original): The method of claim 17, wherein the linkage is cleavable by a chemical, physical or an enzymatic treatment.

Claim 19 (Canceled).

Claim 20 (Currently Amended): The method of claim ~~19~~ 1, wherein the dielectrophoresis force or the traveling wave dielectrophoresis is effected via electrical fields produced by electrodes.

Claim 21 (Canceled).

Claim 22 (Canceled).

Claim 23 (Currently Amended): The method of claim ~~19~~ 1, wherein the acoustic force is effected via a standing-wave acoustic field or a traveling-wave acoustic field.

Claim 24 (Currently Amended): The method of claim ~~19~~ 1, wherein the acoustic force is effected via an acoustic field produced by piezoelectric material.

Claim 25 (Currently Amended): The method of claim ~~19~~ 1, wherein the electrostatic force is effected via a direct current (DC) electric field.

Claim 26 (Canceled).

Claim 27 (Canceled).

Claim 28 (Original): The method of claim 1, wherein the chip is selected from the group consisting of a silicon dioxide, a silicon nitride, a plastic, a glass, a ceramic, a photoresist and a rubber chip.

Claim 29 (Canceled).

Claim 30 (Canceled).

Claim 31 (Canceled).

Claim 32 (Original): The method of claim 1, wherein the manipulation is selected from the group consisting of transportation, focusing, enrichment, concentration, aggregation, trapping, repulsion, levitation, separation, fractionation, isolation and linear or other directed motion of the moiety.

Claim 33 (Original): The method of claim 1, further comprising a step of decoupling the moiety from the surface of the binding partner after the moiety is manipulated.

Claim 34 (Original): The method of claim 1, wherein the moiety is a DNA, the binding partner is a porous bead and the DNA is reversibly absorbed onto the surface of the porous bead in a buffer containing high salt concentration.

Claim 35 (Canceled).

Claim 36 (Original): The method of claim 1, wherein the moiety is a mRNA and the mRNA specifically binds to the surface of a binding partner that is modified to contain oligo-dT polynucleotide.

Claim 37 (Original): The method of claim 1, wherein the moiety is a protein and the protein non-specifically binds to the surface of a binding partner that is modified with a detergent.

Claim 38 (Original): The method of claim 37, wherein the detergent is SDS.

Claim 39 (Canceled).

Claim 40 (Previously presented): The method of claim 1, wherein the moiety is not directly manipulatable by a dielectrophoresis force and the moiety-binding partner complex is manipulated by a dielectrophoresis force.

Claim 41 (Previously presented): The method of claim 1, wherein the moiety is not directly manipulatable by a traveling-wave dielectrophoresis force and the moiety-binding partner complex is manipulated by a traveling-wave dielectrophoresis force.

Claim 42 (Canceled).

Claim 43 (Previously presented): The method of claim 1, wherein the moiety is not directly manipulatable by an acoustic force and the moiety-binding partner complex is manipulated by an acoustic force.

Claim 44 (Previously presented): The method of claim 1, wherein the moiety is not directly manipulatable by an electrostatic force and the moiety-binding partner complex is manipulated by an electrostatic force.

Claim 45 (Previously presented): The method of claim 1, wherein the moiety is not directly manipulatable by an optical radiation force and the moiety-binding partner complex is manipulated by an optical radiation force.

Claim 46 (Currently Amended): The method of claim 1, wherein ~~the moiety to be manipulated is substantially coupled onto surface of the binding partner~~ at least 5% of the moiety to be manipulated is coupled onto surface of the binding partner.

Claim 47 (Currently Amended): The method of claim 1, wherein ~~the moiety to be manipulated is completely coupled onto surface of the binding partner~~ at least 90% of the moiety to be manipulated is coupled onto surface of the binding partner.

Claim 48 (Original): The method of claim 1, wherein the physical force is not a magnetic force.

Claim 49 (Canceled).

Claim 50 (Original): The method of claim 1, wherein a plurality of moieties is manipulated.

Claim 51 (Original): The method of claim 50, wherein the plurality of moieties is manipulated via a plurality of corresponding binding partners.

Claim 52 (Original): The method of claim 50, wherein the plurality of moieties is manipulated sequentially or simultaneously.

Claim 53 (Withdrawn): A method for isolating an intracellular moiety from a target cell, which method comprises:

a) coupling a target cell to be isolated from a biosample onto surface of a first binding partner of said target cell to form a target cell-binding partner complex;

b) isolating said target cell-binding partner complex with a physical force in a chip format, wherein said isolation is effected through a combination of a structure that is external to said chip and a structure that is built-in in said chip,

c) obtaining an intracellular moiety from said isolated target cell;

d) coupling said obtained intracellular moiety onto surface of a second binding partner of said intracellular moiety to form an intracellular moiety-binding partner complex; and

e) isolating said intracellular moiety-binding partner complex with a physical force in a chip format, wherein said isolation is effected through a combination of a structure that is external to said chip and a structure that is built-in in said chip.

Claim 54 (Withdrawn): The method of claim 53, wherein the biosample is a body fluid.

Claim 55 (Withdrawn): The method of claim 53, further comprising a step of decoupling the first binding partner from the target cell-binding partner complex before obtaining the intracellular moiety from the isolated target cell.

Claim 56 (Withdrawn): The method of claim 53, further comprising a step of transporting the obtained intracellular moiety to a new location for coupling the obtained intracellular moiety onto surface of a second binding partner.

Claim 57 (Withdrawn): The method of claim 53, further comprising a step of transporting the intracellular moiety-binding partner complex to a new location for isolating the intracellular moiety-binding partner complex.

Claim 58 (Withdrawn): The method of claim 53, further comprising a step of detecting the isolated intracellular moiety-binding partner complex.

Claim 59 (Withdrawn): The method of claim 58, further comprising a step of transporting the isolated intracellular moiety-binding partner complex to a new location for detecting the intracellular moiety-binding partner complex.

Claim 60 (Withdrawn): The method of claim 53, further comprising a step of decoupling the intracellular moiety from the isolated intracellular moiety-binding partner complex and detecting the decoupled intracellular moiety.

Claim 61 (Withdrawn): The method of claim 60, further comprising a step of transporting the decoupled intracellular moiety to a new location for detecting the intracellular moiety.

Claim 62 (Withdrawn): A method for generating a cDNA library in a microfluidic application, which method comprises:

a) coupling a target cell to be isolated onto surface of a first binding partner of said target cell to form a target cell-binding partner complex;

b) isolating said target cell-binding partner complex with a physical force in a chip format, wherein said isolation is effected through a combination of a structure that is external to said chip and a structure that is built-in in said chip,

c) lysing said isolated target cell;

d) decoupling and removing said first binding partner from said lysed target cell;

e) coupling mRNA to be isolated from said lysed target cell onto surface of a second binding partner of said mRNA to form a mRNA-binding partner complex;

f) isolating said mRNA-binding partner complex with a physical force in a chip format, wherein said isolation is effected through a combination of a structure that is external to said chip and a structure that is built-in in said chip, and

g) transporting said isolated mRNA-binding partner complex to a different chamber and reverse transcribing said transported mRNA into a cDNA library.

Claim 63 (Withdrawn): The method of claim 62, wherein the target cell is a target blood cell.

Claim 64 (Withdrawn): A method for determining gene expression in a target cell in a microfluidic application, which method comprises:

a) coupling a target cell to be isolated onto surface of a first binding partner of said target cell to form a target cell-binding partner complex;

b) isolating said target cell-binding partner complex with a physical force in a chip format, wherein said isolation is effected through a combination of a structure that is external to said chip and a structure that is built-in in said chip,

c) lysing said isolated target cell;

d) decoupling and removing said first binding partner from said lysed target cell;

e) coupling mRNA to be isolated from said lysed target cell onto surface of a second binding partner of said mRNA to form a mRNA-binding partner complex;

f) isolating said mRNA-binding partner complex with a physical force in a chip format, wherein said isolation is effected through a combination of a structure that is external to said chip and a structure that is built-in in said chip, and

determining the quantities of the isolated mRNA molecules,

whereby the gene expression in the target cell is determined.

Claim 65 (Withdrawn): The method of claim 64, wherein the quantities of the isolated mRNA molecules is determined through the reverse transcription of the mRNA molecules to cDNA and determining the cDNA quantities through hybridization of complementary DNA molecules on a chip.

Claim 66 (Withdrawn): The method of claim 64, wherein the target cell is a blood cell.

Claim 67 (Withdrawn): The method of claim 64, wherein the target cell is a cell that has been treated with a drug molecule or a candidate drug molecule.

Claim 68 (Currently Amended): A kit for manipulating a moiety in a microfluidic application, which kit comprises:

a) a binding partner onto the surface of which a moiety to be manipulated can be coupled to form a moiety-binding partner complex;

b) means for coupling said moiety onto the surface of said binding partner; and

c) a chip on which said moiety-binding partner complex can be manipulated with a physical force that is effected through a combination of a ~~structure~~ signal source that is external to said chip and a structure that is built-in in said chip, and wherein

i) said moiety is a protein and said protein non-specifically binds to the surface of said binding partner that is modified with a detergent; or

ii) ~~said kit is used to manipulate a plurality of said moieties~~ said moiety is a DNA, said binding partner is a porous bead and said DNA is reversibly absorbed onto the surface of said porous bead in a buffer containing high salt concentration; or

iii) said moiety is a mRNA and said mRNA specifically binds to the surface of a binding partner that is modified to contain oligo-dT polynucleotide; or

iv) said moiety is not directly manipulatable by a dielectrophoresis force and said moiety-binding partner complex is manipulated by a dielectrophoresis force; or

v) said moiety is not directly manipulatable by a traveling-wave dielectrophoresis force and said moiety-binding partner complex is manipulated by a traveling-wave dielectrophoresis force; or

vi) said moiety is not directly manipulatable by an acoustic force and said moiety-binding partner complex is manipulated by an acoustic force; or

vii) said moiety is not directly manipulatable by an electrostatic force and said moiety-binding partner complex is manipulated by an electrostatic force; or

viii) said moiety is not directly manipulatable by an optical radiation force and said moiety-binding partner complex is manipulated by an optical radiation force effected via a laser tweezers.

Claim 69 (Original): The kit of claim 68, further comprising instruction(s) for coupling the moiety onto the surface of the binding partner and/or manipulating the moiety-binding partner complex on the chip.

Claim 70 (Canceled).

Claim 71 (Canceled).